

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of

Applicants : Burch et al.
Serial No. : 10/623,674
Filed : July 21, 2003
Title : **HIGH EFFICIENCY FUEL PROCESSOR VIA STEAM INTEGRATION
FROM A WATER-COOLED STACK**
Docket : GP-303298 (GMC 0044 PA/40320.48)
Examiner : Keith D. Walker
Art Unit : 1745

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY BRIEF ON APPEAL

This Reply Brief is being filed pursuant to the provisions of 37 CFR 41.41 in response to the Examiner's Answer mailed June 20, 2006. The arguments set forth below are responsive to the assertions made by the Examiner in the Answer. Pursuant to 37 CFR 41.43, the Examiner is requested to acknowledge receipt and entry of the reply brief.

Sections VII.B.1, VII.C, VII.G, and VII.H - The Examiner's interpretation of the claim term "about" is inappropriate

In the Response to Argument (Section 10, page 25) of the Examiner's Answer, the Examiner counters Applicant's argument that neither Grasso nor Bloomfield teaches a High Temperature Proton Exchange Membrane Fuel Cell (HT-PEMFC) as recited in the claims. The

present specification defines HT-PEMFC as fuel cells operating between about 100 °C to about 150 °C. *See ¶ [0016]*. As the Applicants stated in the Appeal Brief, conventional PEM fuel cells, such as the fuel cells of Grasso and Bloomfield, operate from 60 °C to 90 °C. *See ¶ [0004]*.

Accordingly, the Applicants argued that the devices of Grasso and Bloomfield does not teach an HT-PEMFC, because these references fail to teach or suggest a HT-PEMFC operating at temperatures from about 100 to about 150 °C.

Noting this deficiency, the Examiner argues that "about" is not defined in the specification, so "about" could mean that the "about 100 °C" temperature range would extend to 90 °C, thereby overlapping with the conventional temperature range. *See ¶ [0004]*. This assertion directly contradicts the applicant's specification because the applicant acted as his own lexicographer. Patentees are allowed to act as their own lexicographer by defining terms as they choose, as long as this definition is provided in the patent specification or file history. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582-83, 39 USPQ2d 1573, 1576-77 (Fed. Cir. 1996). In this case, the applicant defined in the specification what the operating temperatures of the HT-PEMFC are - 100 to 150 °C, and what the operating temperatures are not - 60 to 90 °C. *See ¶ [0004]*. Thus, the examiner's construction of "about" would encompass operating temperatures for the HT-PEMFC, which directly contradicts the present disclosure.

Furthermore, the examiner's construction of the term "about" is overreaching. The meaning of the word "about" is dependent on the facts of a case, the nature of the invention, and the knowledge imparted by the totality of the earlier disclosure to those skilled in the art." *Eiselstein v. Frank*, 52 F.3d 1035, 1040, 34 USPQ2d 1467, 1471 (Fed. Cir. 1995). Several courts have reviewed the extent in which "about" broadens a claimed range. In *Eiselstein v Frank*, the Federal Circuit held that a disclosure reciting a composition having about 45-55% nickel would

not support a claim reciting "about 50 to about 60%" nickel. *Id.* As the court stated, "[w]hatever the term "about" means in this context, it is clear that it does not extend 55% to encompass 60%." *Id.* Likewise, utilizing the term "about" when defining the operating temperature ranges of the HT-PEMFC i.e. about 100 to about 150 °C does not broaden this range to overlap with the 60 to 90 °C operational range of the conventional fuel cell.

Moreover, one or ordinary skill in the art would not construe "about" to encompass a 10 °C change in temperature (i.e. from 100 °C down to 90 °C) as the examiner proposes, especially in view of the fact that such an interpretation changes the nature of the invention. An HT-PEMFC operates in a range from 100-150 °C - at or above the boiling point of water. If the word "about" is construed as the Examiner proposes, the HT-PEMFC would incorporate an operating temperature of about 90 °C, below the boiling point of water. As stated above, the meaning of "about" is construed based on the nature of the invention. *Eiselstein*, 34 USPQ2d 1467 at 1471. Claim 1 recites that the HT-PEMFC generates the steam needed for the primary reactor. Construing "about" as the Examiner suggests would result in operating conditions below the boiling point of water; therefore, the HT-PEMFC would be unable to generate steam and thus would change the nature of the invention. Consequently, the Examiner's interpretation of the claim term "about" would render inoperable the HT-PEMFC objective of generating steam for the primary reactor. Thus, the operating temperature range of the HT-PEMFC does not overlap with the operating temperature range of conventional fuel cells such as Grasso and Bloomfield. Accordingly, Grasso and Bloomfield fail to teach or suggest a HT-PEMFC as claimed.

For similar reasoning, Eggert also fails to teach or suggest a HT-PEMFC as claimed. Eggert recites a fuel cell operating at 80 °C. As stated, "about" does not broaden the operating temperature of HT-PEMFC's to encompass temperatures of 90 °C, thus "about" clearly does not

encompass the Eggert fuel cell operating temperature of 80 °C. Thus, the Eggert operating temperature does not overlap with the claimed range of the HT-PEMFC. As a result, Grasso, Bloomfield, and Eggert all fail to teach or suggest a HT-PEMFC as claimed.

Section VII.D - Examiner is misapplying the standard for obviousness

Regarding claim 5, the Examiner combined Grasso Bloomfield, and Towler to teach all elements of the claimed invention. Towler is cited for teaching shift effluent coolers capable of heating a deionized water stream, but fails to teach a WGS reactor heat exchanger provided in fluid communication between a WGS reactor and an HT-PEMFC stack, wherein the WGS reactor heat exchanger is adapted to heat the steam before being used in the primary reactor with heat energy from the gaseous reformate. Noting this deficiency, the Examiner attempts to deemphasize this limitation by stating it is a functional limitation. The Examiner further asserts that "that there is no reason to believe that the prior art WGS reactor could not be adapted to heat the steam before being used in the primary reactor with heat energy from the reformate, and Appellant has provided no evidence to the contrary". *See* Examiner Answer, page 25.

As a preliminary matter, the Applicants respectfully point out that all limitations of the claim must be considered. A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. *See* MPEP 2173.05(b). As a result, the Examiner must give all claim elements patentable weight, and must provide a reference that teaches this claim element in order to meet the *prima facie* burden.

The Applicants also point out that the Examiner's above assertions constitute impermissible burden shifting. As stated in MPEP 2142, "the Examiner bears the initial burden

of factually supporting any *prima facie* conclusion of obviousness. If the Examiner does not produce a *prima facie* case, the Applicants are under no obligation to submit evidence of nonobviousness." To establish a *prima facie* case of obviousness, the prior art reference or references when combined, must teach or suggest *all* the claim limitations in order to establish a *prima facie* case of obviousness. *See MPEP 2143*. In the present case, the Examiner concedes that the references fail to teach or suggest a WGS reactor adapted to heat the steam before being used in the primary reactor with heat energy from the reformat; therefore, the Examiner has not met the burden of establishing *prima facie* obviousness. Consequently, the burden of demonstrating nonobviousness has not shifted to the Applicants.

Instead of providing a reference to cure this noted deficiency, the Examiner draws a negative inference stating essentially the references do not rule out the possibility that the WGS reactor could perform this claimed function and thereby teach this claimed element. This negative inference is not the standard for obviousness. The proper analytical framework is provided below in *In re Fritch*:

"The mere fact that prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. 23 USPQ2d 1780, 1783-4 (Fed. Cir. 1991).

In short, the question is not whether the WGS reactor can be used as claimed. The question is whether there is an adequate suggestion or motivation to do so.

In addition to this negative reference, the Examiner states that the Applicants have not provided evidence showing that the WGS reactor is incapable of being used to heat the steam before being used in the primary reactor with heat energy from the reformat. This constitutes impermissible burden shifting, because the Examiner has failed to meet the burden of establishing a *prima facie* case. As a result, the burden has not shifted to the Applicants to respond with evidence demonstrating nonobviousness; therefore, the Applicants are not required to provide evidence that the prior art WGS reactor is incapable of heating the steam before use in the primary reactor with heat energy from the reformat.

In light of the arguments provided herein in conjunction with the Appeal Brief, the Applicants respectfully submit that all rejections have been traversed; therefore, the application is now in condition for allowance.

Respectfully submitted,
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